BAY AREA POLLUTION PREVENTION GROUP

BAPPG

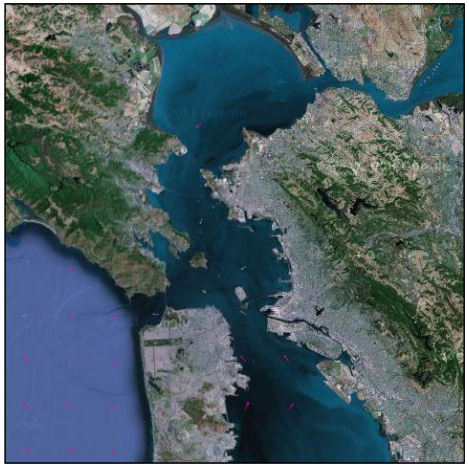
A Committee of Bay Area Clean Water Agencies

Please join us for the next BAPPG meeting!
April 6, 2016
10 am – Noon

Regional Board Office*
1515 Clay Street, Room 2
Oakland, CA

Featuring presentations by:
Dr. Becky Sutton with SFEI on new wastewater pesticides monitoring data and the upcoming meeting on CEC monitoring in San Francisco Bay.

Dr. Kelly Moran and Stephanie Hughes on pesticide activities over the last year and opportunities for further impact with pesticide registration agencies.



Contributors

- Regional Monitoring Program for Water Quality in San Francisco Bay
- Bay Area wastewater community
- Arizona State University
- TDC Environmental
- California Department of Pesticide Regulation

Regional Monitoring Program
for Water Quality in San Francisco Bay

Collect data, communicate information about water quality to support management decisions

Emerging Contaminants: Eyes on the Horizon

April 15th - Emerging Contaminants Workgroup Meeting

June 29th - Microplastic Strategy Workshop

Summer - Coordinate Pharmaceutical Monitoring

Rebecca Sutton, Ph.D.
RebeccaS@sfei.org

RMP CEC Strategy: Three Elements

1. CEC monitoring, evaluating risk

2. Sharing expertise, learning from others

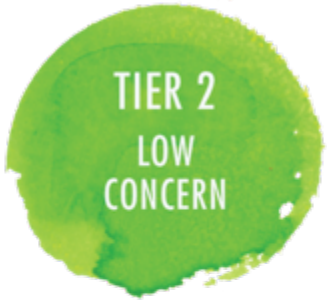
3. Non-targeted monitoring (bioassays, broadscans)

MODERATE OR HIGH IMPACT

None currently

LOW IMPACT

PFOS
Fipronil
Nonylphenol
PBDEs



NO IMPACT

HBCD
Pyrethroids*
Pharmaceuticals
Personal Care Product Ingredients
PBDDs and PBDFs

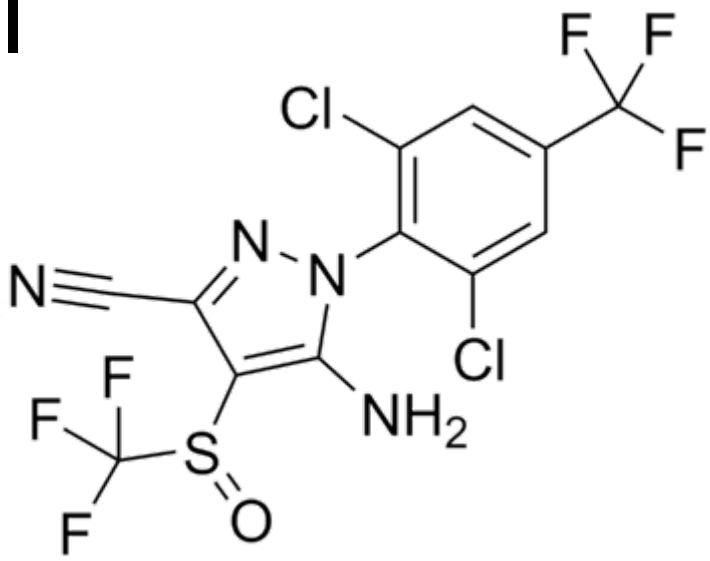
Imidacloprid ?

UNCLEAR

Alternative Flame Retardants
Fluorinated Chemicals
Pesticides, Plasticizers
Microplastic
Many others

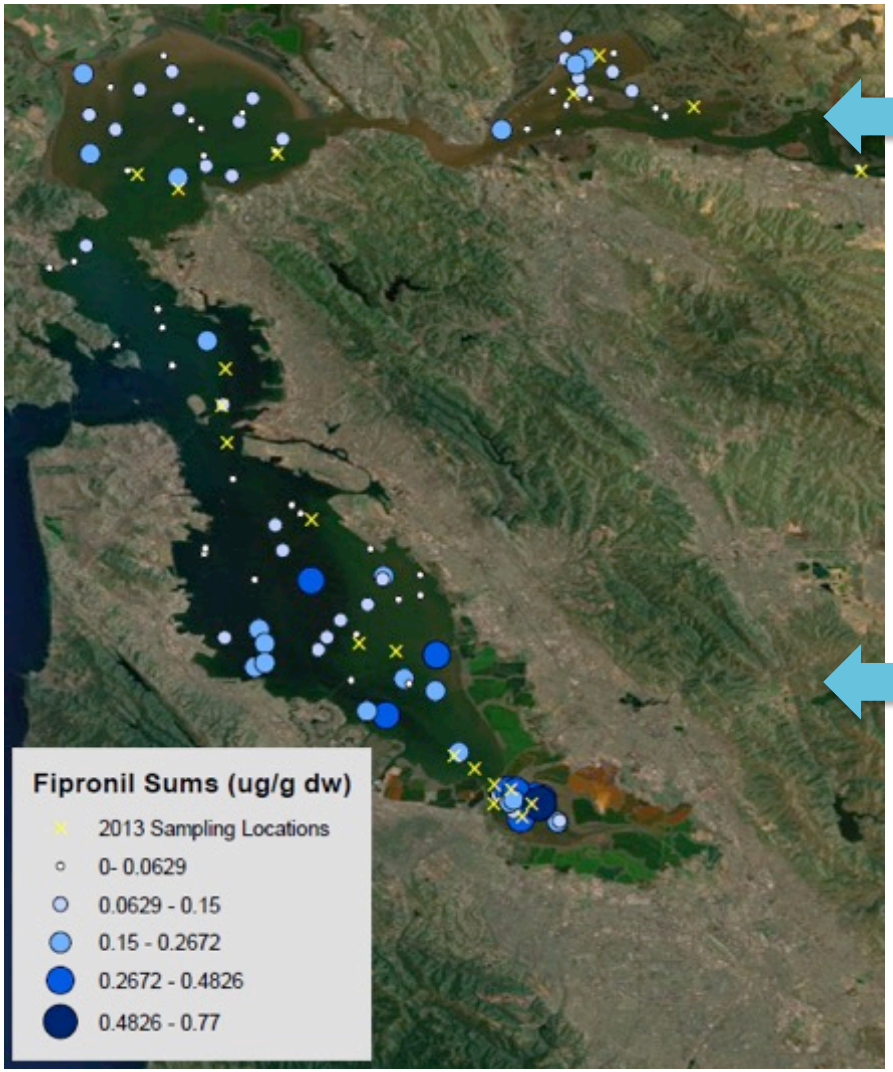
TIER 3
MODERATE CONCERN

Fipronil



TIER 3
MODERATE CONCERN

Fipronil



Pathways to Bay:

Stormwater

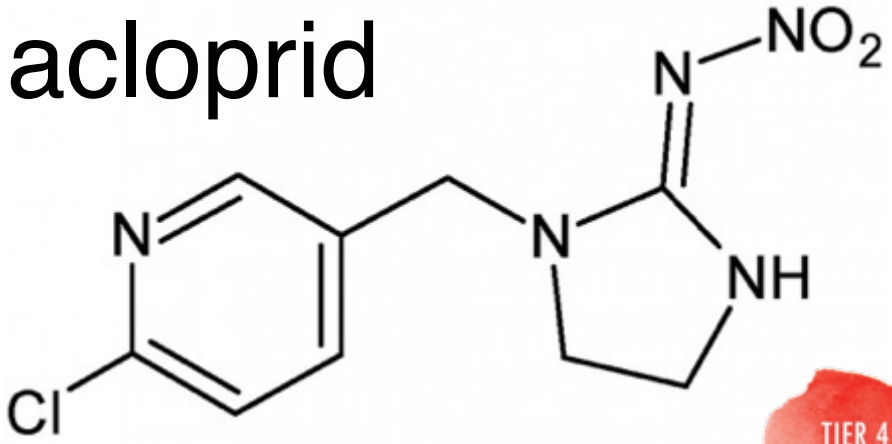
- Detected in **96%** of samples from 6 creeks
- **One-third** exceeded toxicity thresholds

Treated Wastewater

- Limited data suggest treatment has little effect
- RMP study

Imidacloprid

polystyrene insulation,
vinyl siding, adhesives, sealants,
textiles for outdoor use,
pressure-treated wood decking



?

TIER 4
HIGH CONCERN

TIER 3
MODERATE CONCERN

TIER 2
LOW CONCERN

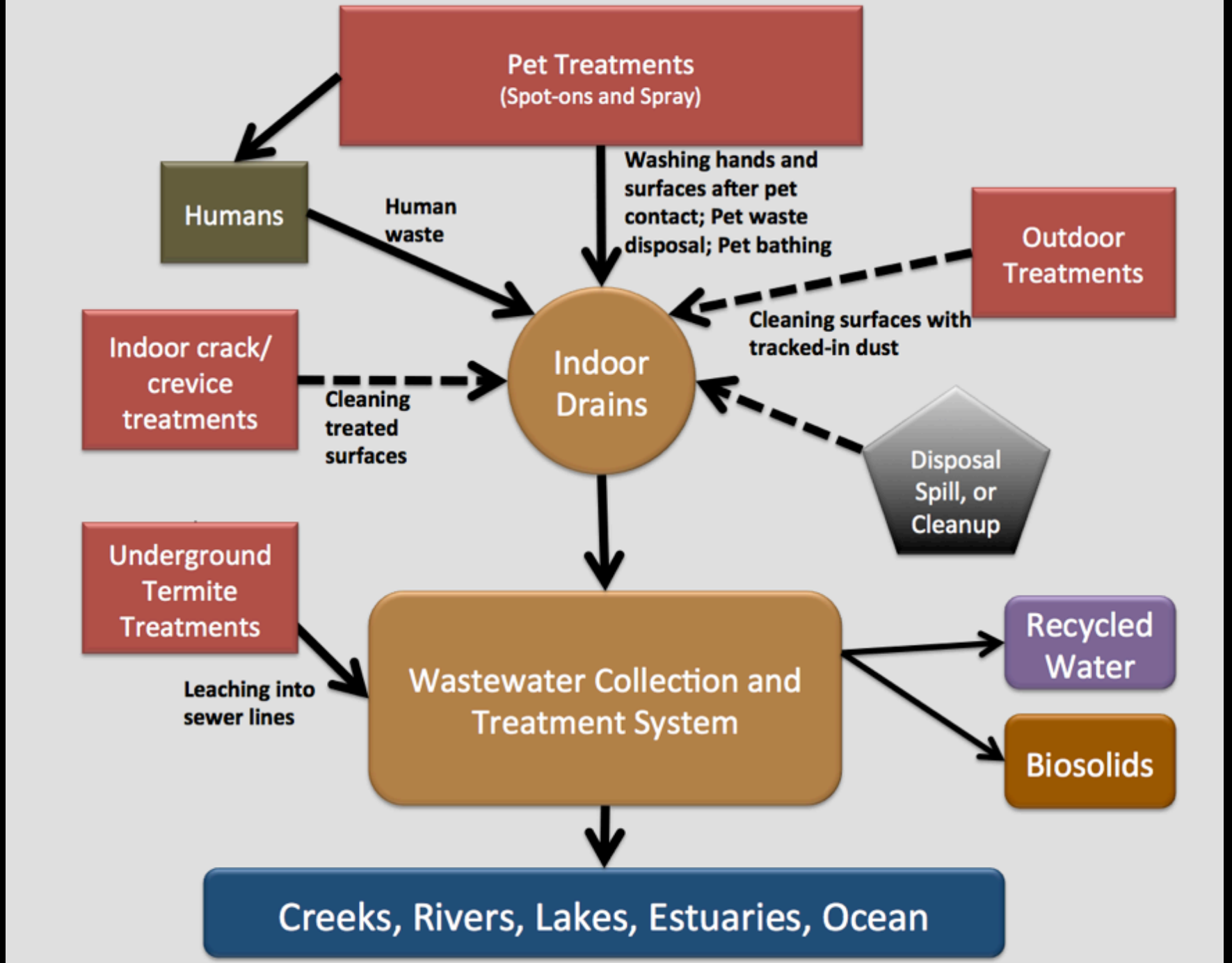
TIER 1
POSSIBLE CONCERN

Wastewater as a pathway for urban pesticides?

24-hour composites
sludge/biosolids

Analyzing Influent Data

- Calculate per-capita influent load
  - Eliminates flow & population differences
  - Compare to discharge estimates
- Evaluate per-capita load variability (CV)
  - Continuous or episodic discharges?


Pet Treatments
(Spot-ons and Spray)
Humans
Human waste
Washing hands and surfaces after pet contact; Pet waste disposal; Pet bathing
Outdoor Treatments
Cleaning surfaces with tracked-in dust
Indoor crack/ crevice treatments
Cleaning treated surfaces
Indoor Drains
Disposal Spill, or Cleanup
Underground Termite Treatments
Leaching into sewer lines
Wastewater Collection and Treatment System
Recycled Water
Biosolids
Creeks, Rivers, Lakes, Estuaries, Ocean

These Data = Big News for EPA & DPR

- Neither agency has ever considered discharges from pet "spot-on" treatments!
- Timing is crucial!
- Best mitigation opportunity = EPA's fipronil & imidacloprid reviews *this year*
- Big changes in whole approach to POTW discharges are possible <u>if we get the word out</u> to EPA & manufacturers

BAPPG is Being Proactive on These Issues

- Reviewing flea/tick alternatives to pet "spot treatments"
  - Chewables minimize pathway to POTWs/water bodies
  - Reviewing other possible impacts/concerns
  - Seeking to recommend an integrated approach for pet owners
- Developed factsheet for BACWA members
  - Seeking to engage wider wastewater community at this crucial time
  - Let's review it together

BACWA's Work is Paying Off - DPR

- Hired wastewater experts
  - Dr. Jennifer Teerlink
  - Dr. Yina Xie
- Developing POTW discharge model
  - Soon: Use for registration decisions!
- Pet Washing Study
- Sewershed Study

Characterizing Indoor Pesticide Use Patterns and Mass Loading in a Wastewater Catchment

CA Department of Pesticide Regulation
Environmental Monitoring Branch
Surface Water Protection Program
1001 I Street, Sacramento, CA 95814

*Jennifer Teerlink, Robert Budd, April DaSilva, Yuzhou Luo, Dan Wang, and Yina Xie

Abstract

The California Department of Pesticide Regulation, Surface Water Protection Program (SWPP) is investigating the use patterns and mass loading from indoor pesticide products to a typical wastewater sewershed. Pesticide concentrations of fipronil and pyrethroids have been reported in treated wastewater effluent at concentrations that exceed EPA Aquatic Life Benchmarks, posing potential risks to the surface waters to which they discharge. A source identification sampling study is being designed to better understand the relative mass contribution from residential, commercial, and institutional indoor pesticide use. Sampling will consist of twelve sampling sites within a sewershed catchment and paired weekday/weekend sampling events in spring, summer, and fall (6 events total). All samples will be taken as 24-hour flow weighted composites to allow for mass loading calculations. Resultant data will be used in conjunction with modeling efforts to better understand indoor pesticide products and uses that may require mitigation.

2016 Sewershed Sampling Sites

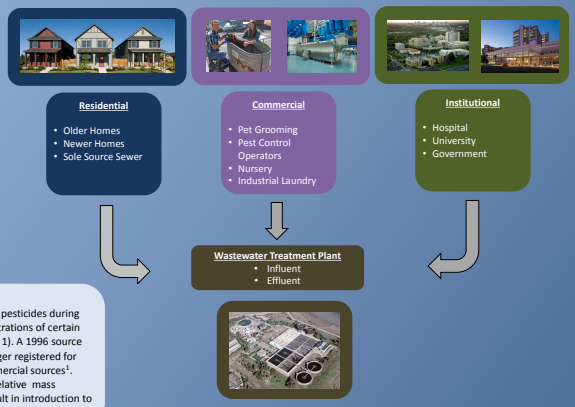


Figure 1. Proposed sampling locations within wastewater sewershed.

Introduction

There are limited data available detailing the fate and occurrence of pesticides during the wastewater treatment process. Available studies report concentrations of certain pesticides in effluent that exceed US EPA aquatic benchmarks (Table 1). A 1996 source identification study measuring organophosphates, which are no longer registered for indoor use, found mass loading of residential inputs exceeded commercial sources[1]. There is a need to gather updated information on the sources and relative mass contribution of pesticides currently registered for uses that may result in introduction to wastewater catchments.

Table 1. Summary of pesticide concentration in treated wastewater effluent reported in literature

Pesticide	PWG Survey[2] Average (ng/L)	DF	PWG Survey[2] Max (ng/L)	Weston 2010[3] Max (ng/L)	DF	Lowest EPA Benchmark[4] (ng/L)
Bifenthrin	0.89	82	3.9	6.3	39	1.3
Cyfluthrin	0.60	60	4	1.7	6	7.4
λ-Cyhalothrin	0.30	48	1.6	5.5	17	2
Cypermethrin	2.11	81	13	17	6	69
Deltamethrin	0.31	16	1.2	2.7	11	4.1
Esfenvalerate	0.25	32	0.6	3.7	6	17
Fenpropathrin	0.22	3.2	0.8	0	0	64
Permethrin	20	65	170	17.2	33	1.4
Heidler 2009[5]						
Fipronil	30	-	70	-	-	11

Sampling Events

- Three sampling events: spring, summer, fall
- Paired weekday/weekend sampling events
- 24-hour flow-weighted composite samples to allow for mass loading calculations.

$$Concentration\left(\frac{mass}{volume}\right) * \text{flow}\left(\frac{volume}{time}\right) = mass\ loading\left(\frac{mass}{time}\right)$$

Objectives

1) Identify and characterize the total mass loading of pesticides to wastewater treatment facility at intake.
2) Quantify mass loading at a sub-catchment scale representing specific pesticide use patterns (residential, commercial, institutional).

Implications

- Provide information on mass loading of target pesticides to wastewater catchment.
- Identify non-target pesticides or adjuvants from unexpected uses that may require additional study.
- Construct a mass balance of specific use patterns at the sub-catchment and compare pesticide use patterns.
- Identify use patterns or active ingredients that may require mitigation.

Analytical Methods

Samples will be analyzed using high resolution mass spectrometry with gas and liquid chromatography to allow simultaneous quantification of the target compounds and identification non-target analytes.

Target Analyses

- 20 Pyrethroids
- Fipronil + Degradates
- Imidacloprid
- Propoxur
- Pyriproxyfen

Non-Target Analyses

- Identification of pesticides or adjuvants not identified as priority
- Enables identification of major unexpected uses

References

[1] Singhasemanon et al. (1998) Diazinon and Chlorpyrifos in the Central Contra Costa Sanitary District Sewer System, Summer 1996, California Department of Pesticide Regulation.
[2] Markle et al. (2014). Pyrethroid pesticides in municipal wastewater: A baseline survey of publicly owned treatment works facilities in California in 2013, Pyrethroid Working Group.
[3] Weston and Lydy (2010). Urban and Agricultural Sources of Pyrethroid Insecticides to the Sacramento-San Joaquin Delta of California. ES&T 44(5): 1833-1840.
[4] http://www.epa.gov/oppefed1/ecorisk_ders/aquatic_life_benchmark.htm
[5] Heidler and Halden (2009). Fate of organohalogens in US wastewater treatment plants and estimated chemical releases to soils nationwide from biosolids recycling. J of Env. Mon. 11(12): 2207-2215.

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UP3/CASQA Update
Stormwater 2016 Priorities

1. DPR pyrethroids special study

   How can DPR improve its urban programs?


Photo: Les Greenberg, UCR

2. DPR fipronil mitigation

3. Imidacloprid


Photo: USGS


Photo: Alan Vernon

State Water Board Pesticides Plan

11/14 – SWRCB Urban Pesticides Workshop

Strategic Direction to prepare Pesticides Plan

1/16 – Stormwater Strategic Initiative

True Source Control element – Pesticides Plan

2/16 – Kickoff! Water Board Pesticides Plan

SWRCB – Region 2 – DPR - CASQA

Draft plan in 2016

Goal - adoption in 2017

Stormwater Only

What Pesticides Plan means for Permittees

SF Bay Area Permit is model

Primary Pesticides Solution = DPR + EPA

Anticipated permit requirements:

1. Outreach/education (OWOW etc.)
2. Limit municipal pesticide use (IPM)
3. Regulatory participation (UP3)
4. Conduct *useful* monitoring

Stormwater Only